

### **ABSTRACT**

The invention relates to an improved mixing arrangement for, primarily, moving bitumen in steam from sources of such bitumen and steam to a reactor or coker for further processing of the bitumen into petroleum products. The invention provides a main conduit connected to an atomizing nozzle mounted in a wall of the reactor and first and second conduits for flowing bitumen and steam respectively into the main conduit. The first conduit is angled relative to the main conduit at an acute angle of about  $45^{\circ}$  and the second conduit is angled relative to the main conduit at an acute angle of about  $30^{\circ}$ . The second conduit is positioned downstream of the first conduit by a short distance of about 23mm and may be angled radially relative to the first conduit by any angle, although a  $90^{\circ}$  angle is preferred. A flow accelerating nozzle is located in the second conduit adjacent the entrance therefrom into the main conduit. The arrangement of the invention improves the flow characteristics of 2-phase material flowing to the atomizing nozzle, reducing pulsations in the main conduit and improving the resulting atomization of the bitumen in the reactor.